



THE GROUND PLANE
SOUTH BAY AMATEUR RADIO ASSOCIATION
ARRL MEMBER CLUB SINCE 1974



Volume 1 Edition 3

Fremont, Ca.

March 2000

Welcome to the March Ground Plane

Leprechauns are capturing the hearts of many a we-little lass this month as St. Patrick's Day highlights March. Irish mythology depicts that the end of the Rainbow has a Pot-of-Gold waiting for you to claim it....

May the Luck of the Irish be with you all!....

Ham Radio Begins Workshop Program
Ham Radio Outlet – HRO at the Sunnyvale location is having an 'in-store' workshop on Saturday morning March 25th for SBARA.

Come and play with those new radios and see the newest products Ham Radio has in store for all of us !!

Directions may be found at <http://www.hamradio.com> or contact Al Rendon, WT6K for more details...

News: FCC License Restructuring - Details at <http://www.arrl.org> or <http://www.fcc.gov>

PRESIDENT'S LETTER

March 2000

The other day I was at HRO and learned there is a run on 'upgrade books' for General thru Extra Class exams. It seems everyone wants to upgrade before the new tests are in place. I wondered how many of these folks will take the 'cram course' versus studying the material. How many will already have HF experience?

One of the core functions of SBARA is to facilitate the needs and interests of our membership. If the hams at HRO are representative of our members, then it's likely that SBARA will need to create a 'Getting the Most out of your General Class privileges' type workshop. This can either be a preparatory program for taking the element 3B test, or a 'follow-up' program on how to operate on HF.

We envision a short series of 2 hour workshops on 4 consecutive Saturday mornings covering: 1) electronic components & circuits; 2) radio equipment systems; 3) antennas and feed lines; 4) radio wave propagation. The other material like frequencies and operating practice can be memorized on your own. This series would ideally prepare you not only for the 3B test, but also give you lots of practical knowledge of what HF and General Class is all about.

The Leadership Team 2000 and especially your Programs Facilitator Al Rendon (WT6K) would like to hear from you if you have any interest in attending or even teaching a section of such a program.

See on March 15 at the next General meeting!

INSIDE THIS ISSUE

- 1 SBARA Presidents Message
- 2 APRS – March Presentation
- 6 The DX Gremlin
- 7 February Ham Workshop

CLUB T-SHIRTS FOR SALE

There are still a few SBARA t-shirts available for \$10 each. Contact Helen Campbell at 510-790-0294 or helndugc@wco.com.

March 2000 Meeting Guest Presenter

Want to see APRS (Amateur Radio Positioning System) in action? Do you want to learn how it keeps track of your position and transmits it to the ham community? If you do then come to the March 15, 2000 SBARA meeting and listen to what Paul Carlin KE6NVU has to say about APRS. It's a timely topic since many of SBARA's members will be participating in the Baker to Vegas or Primavera communication support efforts. APRS will be used in both events to keep track of moving vehicles and even race participants. Mark March 15th on your calendar. Don't miss the presentation on this amazing technology.

Rare DX Opportunity

As some of you may have known Rudi recently was on a Cruise. This message came in from an Eye-Ball QSO...

I meet your president today. He is on the Mandaley. He gave me you guys web site. My name is Roger and call is J73MBQ.

Just waving a hand from the beautiful island of the Commonwealth of Dominica.

Best of 73 to you. Roger J73MBQ

BECOME A 'HAMBASSADOR'

Do you have kids in school? Do you know someone in a retirement community? How about a long-distance truckdriver? Or senior citizens who travel in their RV? Maybe you belong to another local community services organization?

Here's your chance to spread the word about SBARA and ham radio in general. With your help, the Club can arrange for a 'show and tell' for your group. Please contact Rudi Wiedemann, Public Information Officer.

LEADERSHIP TEAM 2000 OPPORTUNITIES

You've read elsewhere in this issue about the exciting new plans the current Leadership Team 2000 members have for this year. Here's your chance to contribute and expand the scope of what we can accomplish.

QUARTERMASTER: Collect and manage the use of Club materials including radio equipment, A/V materials and books.

SPECIAL EVENTS DIRECTOR: a) ensure the Club has an organized presence at all important local non-club functions like Primavera, Field Day, Pacificon, etc, b) seek out or create engaging new community events and help organize Club participation.

CHRONICLER: Research and summarize the Club history, and submit interesting 'snippets' about Club members and activities.

If you (or someone you know) are interested in learning more about the above position, please contact Rudi Wiedemann directly.

April Meeting Presentation

Don't miss the fun at the April 19, 2000 SBARA meeting. Syd Furman W6QWK will be leading a transmitter hunting presentation and follow-on transmitter hunt in Central Park for everyone in attendance. The presentation will stress the concepts, equipment and different methods of T-hunting while the T-hunts will give practical experience to those who participate. Syd and friends plan to have two hunts going on simultaneously. One for participants that is new to T-Hunting and one for participants that have been on a T-Hunt before. Transmitter hunting skills are becoming more and more important in locating and reporting 'jammers' and in helping hams 'self-police' the amateur radio frequency spectrum.

If you have ever wondered what it is like to go on a T-hunt, do not miss this opportunity on April 19th to be on a hunt with the SBARA experts. Bring your 2-meter HT with fully charged battery and a flashlight. That is all that will be required for you to take part in this FUN event.

CLUB STARTS A 'RESOURCE COLLECTION

Do you have radios, equipment or supplies you don't use much anymore (or belongs to the Club)? The Club is collecting donations of working (or easily serviceable) radios, antennas, equipment & ham-related materials. This can be anything from an old single-band 2m HT to a multi-band HF rig. We're also looking for Morse code training stuff, videotapes & recent license manuals.

The whole idea is to loan these materials to new (and upgraded) hams, so with the help of their Elmer they can get their ticket and enjoy their new privileges faster! If you want see your stuff put to good use rather than collect dust, then please contact Rudi Wiedemann right away for donations.

Help Wanted

Are you interested in assisting assembling and mailing the GroundPlane? If so, our Newsletter Editor is looking for a little help with the production of the Newsletter.

If you are interested in helping, give Bill a call. He'll be happy if a few co-members would assist him in this important role!

Thanks

SBARA Club Officer Reports

Treasurer

Total cash assets 1/27/2000: \$2738.56

Income since then: \$283.84

Expenses: \$147.56

Current balance 2/27/2000: \$2881.06

Projected for March: Income \$300, expenses \$200.

A REMINDER: If you plan to pay your dues at the March meeting, please bring a completed renewal form to be sure you are included in the 2000 roster.

Ted – N6BFO

Secretary

The General Meeting minutes from our February meeting are contained within the body of the Newsletter.

<http://www.pdarri.org/ebsec> once you are on this page click on the line including "Syd

Furman---Instant Trainer". Sorry! >

<Last month's newsletter gave information in a "Ham Class Announcement". Please add to that the following suggested contacts:

Ross at 650-345-3383, if not reached then use

Jack or Marilyn at 510-276-4351

2/16/00 GENERAL MEETING MINUTES

Meeting was called to order by Rudi Wiedemann at 7:30 p.m.

Attending: President Rudi Wiedemann KF6RLQ, Vice President Alan Kittrell KE6YKK, Secretary Elise Ciraolo KF6TQB, Treasurer Ted Cameron N6BFO, Program Facilitator Al Rendon WT6K, and 32 members and guests.

New web master is Tony Flusche AB6BR.

Alan Kittrell requested sign-ups for those members willing to be Elmers. Also requested that those members who can access the SBARA web sight volunteer to receive their Ground Plane electronically. A great deal of time and money will be saved if we don't have to mail out as many hard copies of the ground plane as previously. Members will benefit by receiving the Ground Plane earlier and in color.

Rudi has donated some books to the resource collection and requested additional donations of books, tapes, videos, learning software, and any hardware from the members. He advised that the next board meeting would be 2/17/00 and the next general meeting would be on 3/15/00.

Stu from Sunnyvale VEC announced that the cost of tests would now be \$6.50.

Andy Mascsak WD6CJK advised he needs a replacement fox for the 3/4/00 hunt in Fremont.

Brian Krause from Fremont CERT announced that the next two training sessions will be on 3/9/00 and 3/18/00.

Kevin Kraw KF6BJK received the ARRL Friendship Award. Lloyd Hartshorn has also earned the award but has not received the certificate from Steve Bassett yet. . . .

Tony Flusche has updated the SBARA web site: www.qsl.net/SBARA

Bill Artelt WB9YVM, our newsletter editor, needs volunteers to help assemble and mail out the Ground Plane. Please contact him if you have a couple of hours each month.

Jim Wood KE6IVA has the new name tags.

See Elise Ciraolo for SBARA T-shirts.

Professor Twiggs and Dave Joseph from Stanford University along with Dick Coores KM6EP presented their program on satellites.

Meeting was adjourned at 9:55 p.m.

Submitted by Elise Ciraolo KF6TQB

Leadership 2000 Officers

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(H) 510-794-4669

May SBARA Meeting Program

Announcement.

Nils Holmes (N1LS) of Globalstar will be describing the Globalstar LEO (Low Earth Orbit) satellite phone service. This presentation will give a real life application of satellites in communications giving a glimpse of what the future has in store for us. Mark your calendar for May 17th to come and hear Nils Holmes.

Starts at 7:30PM.

Also, plan to attend Pal Carlin's dynamic workshop on Emergency Communications. Paul has an interesting presentation and hands on session planned for the Saturday May 20th workshop at the Fremont Community Center in Central Park. Time: 2 to 4:00PM in the afternoon.

Ham Class Announcement

Ham class is April 15 (Saturday) at the Mount Alverno Conference Center in Redwood City, 3910 Bret Harte Drive. This class will be the First class under the new licensing regulations and will offer code testing at 5WPM; upgrading without testing (for those who qualify); and classes for the new technician, general and extra licenses (the extra will require advanced study, please talk to me for information).

Class will start at 8:30AM each morning and will run until approximately 5:30PM. If you are interested please let me know.

Class size is limited - please reserve early.

Interesting Fact...

Did you know that your Radio Club – SBARA has a World Wide Web site?

Check it out at – <http://www.qsl.net/sbara/>

Thanks to the current Web Development staff for making the Clubs WWW possible!
Newsletter Editor...

June Event

Mark you calendars for the Ham event of the year - Field Day 2000!!! This yearly event sponsored by the ARRL features emergency preparedness for all Hams throughout the Country - Work all hams anywhere from a multiple of modes and operating environments. SBARA participates and is looking for ideas on hosting this event for the community to visit - Lake Elizabeth is our location once again this year...

February 26, 2000 Emergency Ground Plane Antenna Workshop

Have you every worked on an antenna production line? Probably you have not. Well, on Saturday February 26th a group of SBARA hams gathered at the Fremont Community center to assemble ten 2meter/70cm antennas on a production assembly line.

We met at 9AM to set up the different assembly stations. Then after coffee, orange juice and bagels the fun began. Each participant in the workshop received a complete kit of parts to assemble their antenna. They were grouped into teams that worked at one assembly station and then when done moved on to the next stage.

There was an antenna element cutoff and solder tinning table. A table to solder the element to a threaded coupler. Another table to assemble the hub. Finally, a table to cut to length and glue together the PVC carrying case.

Overall the production line approach worked very well. There was one problem that required a modification by the 'manufacturing engineering' department before production at the hub assembly station could proceed.

Also, the group experienced a solder pot meltdown when the bottom of the solder pot at the antenna element tinning table gave way and all the solder in the pot spread out over the table!

Yes... there were some moments of laughter. After we were done a group went out side and measured the SWR of one to the 2-meter antennas. The SWR was 1:1 at 145Mhz and 1.2:1 at 148Mhz, not bad for a 'first cut'. I want to thank Sys Furman W6QWK and John Cincotta N6PLR for helping out at the workshop. I couldn't have done without the 'extra' pair of hands.

Also, a big 'thank you' to Elise Ciraolo KF6TQB for taking photographs for the SBARA Newsletter of the workshop.

Emergency Ground Plane Antenna Workshop Event Photographs



The DX-Gremlin

A Superb Wide-band HF Aerial

The author has been aware for quite some time that erecting an aerial for each specific HF band can be a little messy - particularly in a small garden or yard. After much experimentation the design for the DX-Gremlin was perfected and has proved to be very useful at this location. An added bonus is that the DX-Gremlin is fully rotatable.

Description - The DX-Gremlin

Refer to the diagram above. A and B are both 67-foot square pieces of mildsteel. I was lucky to find these in my junk-box but it may be necessary to make friends with the owner of your local steel mill and ask if he has anyoff-cuts. These pieces of steel must be electro-plated with a fairly thick copper coating. This may well prove to be the most difficult part of making the antenna. I managed to coat mine by purloining the family bath, removing it to the garden, and coating the plates a little at a time. This could take awhile to complete!

When the steel plates have been prepared and any rough edges removed it is time for a little welding. Four supermarket trollies should be obtained and carefully welded to the point's marked "T" in the diagram. These trollies may be simply removed absent-mindedly from your local store, or they can quite often be found in rivers or in bushes outside bars or pubs. Try to select four trollies with stable wheels, as this will greatly assist the rotation of the aerial when complete. With the welding complete, the feeder (either 300 ohm twin or 50 ohm coaxial cable) should be connected to the point X. You will now need the assistance of a few friends in order to erect your new antenna. With the steel plates in the air and the trolley wheels firmly planted on the ground you are now ready for an on-the-air test. Results have been comparable to any other wide-band dipole. The added convenience of being able to rotate the antenna is well worth the extra effort in construction.

Note: One or teething problems have manifested themselves since the antenna was first constructed and my solution to these may be of use to the first-time builder. It was noticed that if there were even the slightest breeze the entire antenna would fall over. This is best avoided because it will be realized that it weighs several tons. A solution to this problem was found simply by filling the supermarket trollies with pig-iron. Although this made the entire structure more stable it did not assist with the mobility of the antenna when being manually rotated. However, by careful experimentation it was found that the amount of pig-iron used is critical and eventually it was possible to add enough to make the antenna stable (just) and rotatable (just).

It is recommended that the antenna be taken down during adverse weather conditions.

Alameda County Emergency Manual

An updated version of the Alameda County Emergency Manual, or Instant Trainer, is on the web,

<http://www.pd.arll.org/ebsec/IT2000pdf>

This was prepared as a joint effort with the County ECs. The final step of converting it to a file acceptable to the web was made possible using the expert help of Alan Kittrell-KE6YKK. His help was invaluable! All hams, please take a look and maybe download and print a copy. Please report all errors or proposed changes to your EC. The previous Editor-in-Chief is taking a long trip and plans to lose all typesetting expertise. Syd-W6QWK"

May SBARA Meeting Program Announcement.

Nils Holmes (N1LS) of Globalstar will be describing the Globalstar LEO (Low Earth Orbit) satellite phone service. This presentation will give a real life application of satellites in communications giving a glimpse of what the future has in store for us. Mark your calendar for May 17th to come and hear Nils Holmes.

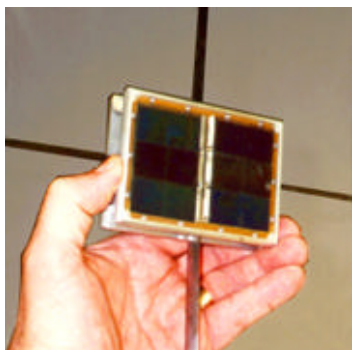
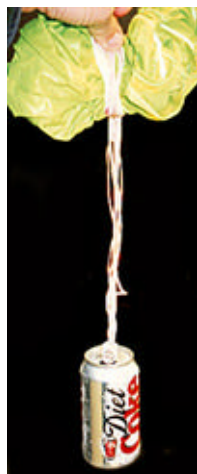
Correction of May program announcement in the February Newsletter

February's Ground Plane newsletter incorrectly described the May meeting program subject as Internet Gateways. The correct subject is Globalstar LEO (Low Earth Orbit) satellite phone service. (Editor)

Thank You

A special Club "thank you" to Professor Twiggs and Dave Joseph from Stanford University along with Dick Coores KM6EP presented an excellent program on satellites. Presentation photos in this issue of the GroundPlane.

February Satellite Presentation



QUICK REFERENCE CORNER

This Month: Local Regular Nets

NET	DAY	TIME	FREQ
NoCAL Net	Dly	1930	145.210-
Antioch EC	Sun	2100	146.535s
Livermore			
RACES	Mon	1900	147.120+
			145.350-
			145.430-
			PL 100.0
Hayward			
(EB) ARES	Mon	1930	145.130-
			PL 127.3
SATERN	Mon	1930	
			147.060+
			PL 100.0
SATERN	Mon	2000	
			145.110-
			PL 82.5
Tri-City ARES	Tue	1930	147.015+
SCC ARES	Tue	2000	146.115+
AlCo ARES	Wed	1900	147.240+
			444.200+
			PL 107.2
Contra Costa			
ARES	Thu	1900	145.680s
			146.535s
			146.355-
			PL 100.0
			145.110-
			PL 82.5
NAICo ARES	Thu	1915	147.480s
			440.900+
			PL 114.8
Contra			
Costa			
ARES	Thu	1920	147.060+
			441.325+
			PL 100.0
Oakland			
ARES	Thu	1930	147.585s
			146.880-
			PL 77.0
Hospital Net	4 We	1200	147.060+
			PL 100.0

SBARA - CALENDAR OF EVENTS

CLUB MEETING MARCH 15, 2000

PLACE - FREMONT COMMUNITY CENTER

TIME - 7:30PM

SABARA continues the new Century with a spectacular presentation. See the February Newsletter for details. Come and join us for a fun-filled evening.

March Program – APRS

VE FCC LICENSE TESTING

PLACE - LAKE ELIZABETH BOAT HOUSE

TIME - 7:00PM

Take you FCC License Exam hosted by the Sunnyvale VECs. Cost is \$6.50 for each exam – Novice thru Extra including code tests are given the second Monday of every month.

Upcoming test dates are:

March 6, 2000

Fee: \$6.50

Two Forms of Identification are required prior to testing.

Upcoming VEC Test Sessions

Date & Time

Sat, Mar 11, 1030
Mon, Mar 13, 1900
Sat, Mar 18, 1100

Location

Sunnyvale
Fremont
Redwood
City

Test Locations

FREMONT

Fremont Community Center
40204 Paseo Padre Parkway
@ Lake Elizabeth, just S. of boat ramp

SUNNYVALE

840 Washington Ave.
Washington Park

REDWOOD CITY

American Legion Hall
651 El Camino Real

CUPERTINO

Compaq Computer, Tandem Div.
19333 Vallco Parkway
(FIRST street S. of Vallco Mall Bridge)
(Register with Security FIRST)

WHO'S WHO IN HAM RADIO

ADVANCED

Leaps tall buildings in a single bound;
Is more powerful than a locomotive;
Is faster than a speeding bullet;
Walks on water, and gives policy to GOD.

GENERAL

Leaps short buildings in a single bound;
Is more powerful than a switch engine;
Is just as fast as a speeding bullet;
Walks on water if the sea is calm;
Talks with GOD.

CONDITIONAL

Leaps short buildings with a running jump
AND favorable winds...
Is almost as powerful as a switch engine;
Is faster than a speeding BB;
Walks on water in an indoor swimming pool;
Talks with GOD if special request is approved.

TECHNICIAN (Old)

Barely clears a Quonset hut;
Looses tug-of-war with a locomotive;
Can fire a speeding bullet;
Swims well;
Is occasionally addressed by GOD.

TECH-PLUS

Runs into buildings;
Recognizes locomotive two out three times;
Is not issued ammunition;
Can stay afloat with a life preserver;
Talks to walls.

NOVICE

Makes high marks on the wall when trying to leap small buildings;
Is run over by locomotive;
Can sometimes handle a gun without inflicting self-injury;
Talks to animals.

TECH

Falls over doorsteps when entering buildings;
Says, "Look at the choo-choo";
Wets himself with a water pistol;
Plays in mud puddles;
Mumbles to himself.

AMATEUR EXTRA

Lifts buildings and walks under them;
Kicks locomotives off the track;
Catches speeding bullets in their teeth AND EATS THEM;
Freezes water with a single glance;
THEY ARE GOD!

Author Unknown; But rumor has it, that he has been demoted to 11 meters and is now a CBer, he can occasionally be heard Eastbound and Down!

In addition...

NO CODE EXTRA

Flaunts honorary degree in "Tall Building Jumping";
Exhibits powerful ulterior "Loco Motives";
Attempts to avoid speeding bullets;
Is able to "Pass Water", usually without difficulty
Denny's the existence of GOD; Cohort of CB'ers

12 Store Buying Power!



ICOM HF ...THE LEGACY CONTINUES!

IC-706MKIIG

Proven Performance Mobile or Base

- All mode HF/6M/2M/70cm
- 50W on 2M, 20W on 440 MHz
- DSP standard

\$50 COUPON with purchase of IC-706MKIIG

\$80 COUPON with purchase of AH4 and IC-706MKIIG

\$100 COUPON with purchase of AT180 and IC-706MKIIG

DUAL WATCH

IC-756PRO All Mode Transceiver

NEW!

- HF + 6 meters
- Newly designed 32 bit DSP
- 5 inch TFT color LCD
- Digital twin PBT
- Much more!

This device has not been approved by the FCC. This device may not be sold or leased, or offered for sale or lease, until approval of the FCC has been obtained.

BUILT-IN TUNER

IC-746 All Mode 160M-2M

\$200 COUPON

- 100W output for all bands
- IF-DSP+ twin pass band tuning (PBT)
- Large, multi-function LCD with band scope

Get a FREE Log book with purchase

LOW PRICE

IC-2100H 2M Mobile Transceiver

- Cool dual display
- 55 watts
- CTCSS encode/decode
- Backlit remote control mic
- Mil spec 810, C/D/E for shock & vibration

LOW PRICE

IC-T81A 4 Band Transceiver

World's First 4-band HT

- 50, 144, 440 MHz & 1.2 GHz bands
- 5 W at 13.5V DC
- Ni-MH battery standard
- AM, FM, WFM
- "Joy-stick", multi-function switch
- CTCSS encode/decode
- RIT and VXO for 1200 MHz

FULL COLOR LCD DISPLAY

IC-2800H Dual Band Mobile

Mounting Kit Included

- 2M-440MHz
- 9600 baud ready
- Band scope
- CTCSS encode/decode
- Selectable squelch attenuator
- 232 alphanumeric memories
- 3" TFT LCD disp
- NTSC video input

IC-Q7A Dual Band Transceiver

\$25 COUPON

\$30 COUPON

IC-T22A 5W, 2M Handheld

Shirt-Pocket Size Offers Fun on the Run!

- Shirt pocket small
- 4.0 - 16 V DC input
- Auto low power/power saver
- 80 memory channels
- VHF/UHF air band receive
- Auto repeater function
- Backlit display
- Die cast aluminum

\$40 COUPON

IC-T7H 6W, Dual Band Transceiver

Dual Bands at a Single Band Price!

- Easy operation!
- 2 M/440 MHz
- 9 DTMF memories
- 70 memories
- Great audio
- CTCSS encode/decode
- Auto repeater

IC-207H Dual Band Mobile

\$40 COUPON

- 2M/440 MHz
- Wide band rx (includes airband)
- 9600 BPS packet ready
- 45W VHF (2M), 35W UHF (440 MHz)
- CTCSS encode/decode
- 4 power settings per band

IC-R75 HF/50 MHz Base Receiver

\$100 COUPON

MAIL-IN FREE DSP (UT106) OFFER

IC-R2 AM, FM, WFM Receiver

- Wide band coverage: .5 -1300 MHz **
- Excellent audio
- 400 memory channels
- Small - compact design
- Ni-Cd batteries
- PC programmable

IC-R10 All Mode Transceiver

\$50 COUPON

- Wide band coverage - .5-1300 MHz **
- All Mode: FM, WFM, AM, USB, LSB, CW
- "Real time" band scope
- Multiple scan modes
- 1000 memory channels

MAIL-IN FREE PC SOFTWARE OFFER

IC-T8A 5 W Tri-Band Transceiver

FREE Alkaline Battery Case!

- 6M/2M/440MHz
- Easy intuitive operation
- 123 memories
- 5W @ 13.5 V

IC-W32A Dual Band Transceiver

- Advanced 2M/440 MHz
- 5W @ 13.5 V
- 200 memories w/alpha naming
- CTCSS encode/decode w/ tone scan
- Dual band with V/V, U/U
- Optional PC programmable



ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, KL7MF, Mgr.

BURBANK, CA
2492 W. Victory Bl., 91506
(818) 842-1786
(800) 854-6046
Eric, KA6IHT, Mgr.
Victory Blvd. at Buena Vista
1 mi. west I-5

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, W17YN, Mgr.
I-880 at 23rd Ave. ramp

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa

SUNNYVALE, CA
510 Lawrence Exp. #102
94086
(408) 736-9496
(800) 854-6046
Ken, K1ZKM, Mgr.
So. from Hwy. 101

NEW CASTLE, DE
(Near Philadelphia)
1509 N. DuPont Hwy., 19720
(302) 322-7092
(800) 644-4476
Rick, K3TL, Mgr.
RT.13 1/4 mi., So. I-295

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Rich, KK7PL, Mgr.
Tigard-99W exit
from Hwy. 5 & 217

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
Joe, KD0GA, Mgr.

PHOENIX, AZ
1939 W. Dunlap Ave., 85021
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
1 mi. east of I-17

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Phil, N4DRO, Mgr.
Doraville, 1 mi. no. of I-285

WOODBRIIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
22191
(703) 643-1063
(800) 444-4799
Mike, N4MDK, Mgr.
Exit 161, I-95, So. to US 1

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, KM4NZ, Mgr.
SALES@HAMRADIO.COM
Exit 1, I-93;
28 mi. No. of Boston

**Cellular blocked: unblocked OK to FCC approved users. Coupons: Check with your ICOM dealer for details/restrictions.
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CALL TOLL FREE

Phone Hours: 9:30 AM - 5:30 PM
Store Hours: 10:00 AM - 5:30 PM
Closed Sun.

Toll free, incl. Hawaii, Alaska, Canada; call routed to nearest store; all HRO 800-lines can assist you, if the first line you call is busy, you may call another.

West.....800-854-6046
Mountain.....800-444-9476
Southeast.....800-444-7927
Mid-Atlantic...800-444-4799
Northeast.....800-644-4476
New England...800-444-0047

Look for the
HRO Home Page
on the
World Wide Web
<http://www.hamradio.com>

AZ, CA, CO, GA,
VA residents add
sales tax. Prices,
specifications,
descriptions,
subject to change
without notice.

The Ground Plane
South Bay Amateur Radio Association -
SBARA
P.O. Box 8377
Fremont, Ca. 94537-8377
February-2000 Newsletter

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